

Food Deserts in South Dakota

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The Food Desert Metaphor

- First used in the U.K. to describe lack of access to food due to grocery store closures in deteriorating neighborhoods in cities
- Uneven distribution of consumer food sources leads to areas of concentration and places with limited or non-existent access to food choices (*Morton, 2005*)
- Differential access to healthy and affordable food based on socio-economic conditions (*Beaulac, Kristjansson, and Cummins, 2009*)

Food Desert in the U.S. context

- In the U.S., proliferation of convenience stores and mini-marts provides increased access to food
- Clouds quality, nutritional, and affordability factors
- Food desert alternately defined as residential proximity to large food retailers (*Morton and Blanchard, 2007*)

Goals

- Identify and characterize food deserts in South Dakota, a large rural state, based on geographic access to retail food
- Use GIS for identifying food deserts – regions with limited or non-existent geographic access to large food retailers
 - Create a set of maps to visualize the process of categorizing food deserts
 - Characterize food deserts vs. non-food deserts to gain socio-economic insights, if any

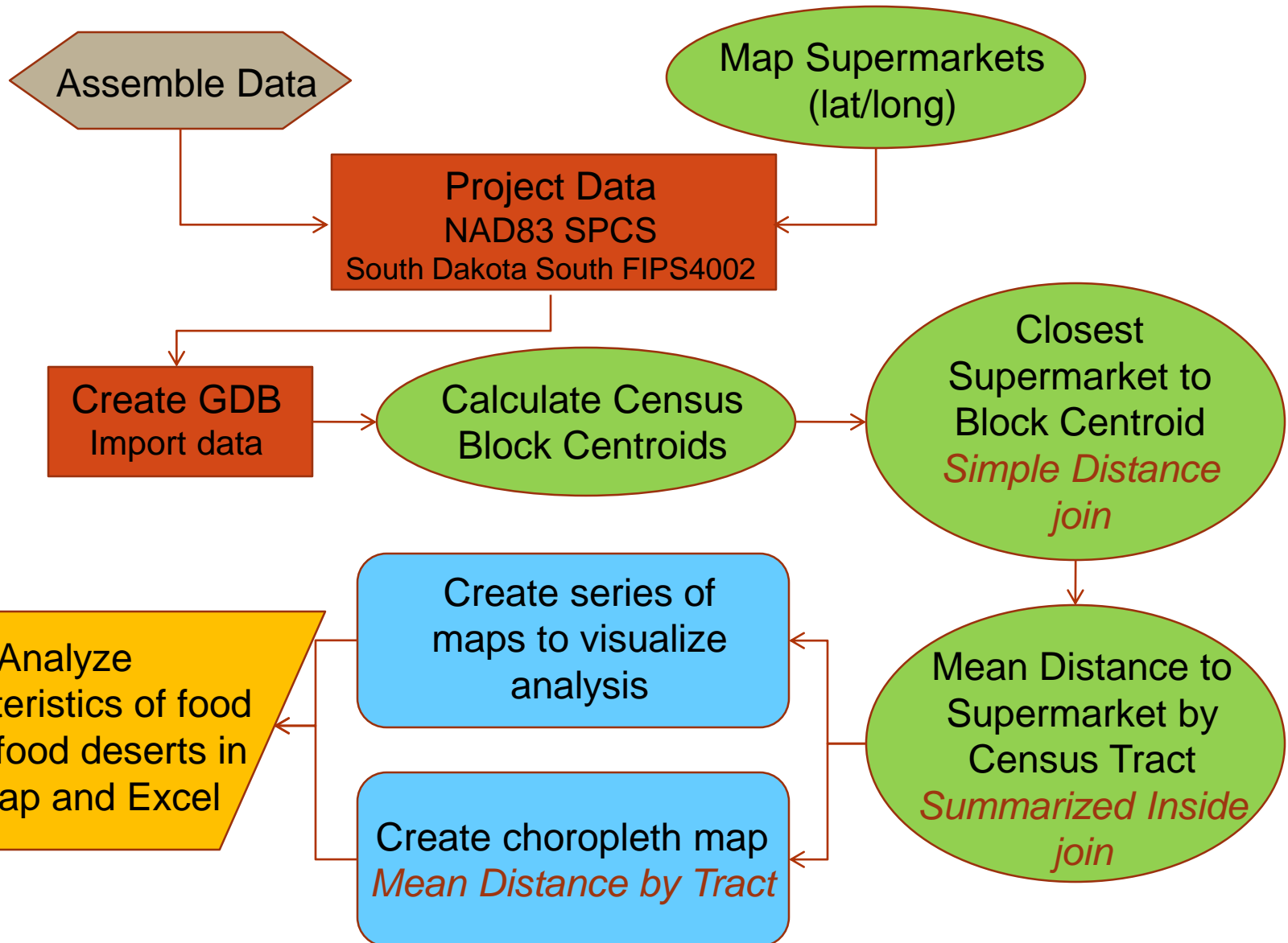
Methodology

- Calculate distance between residential locations and supermarkets
- Locate cities, counties, and major roads in the state to visualize the relative locations of supermarkets and food deserts
- Aggregate distances by census tract to identify and characterize food deserts

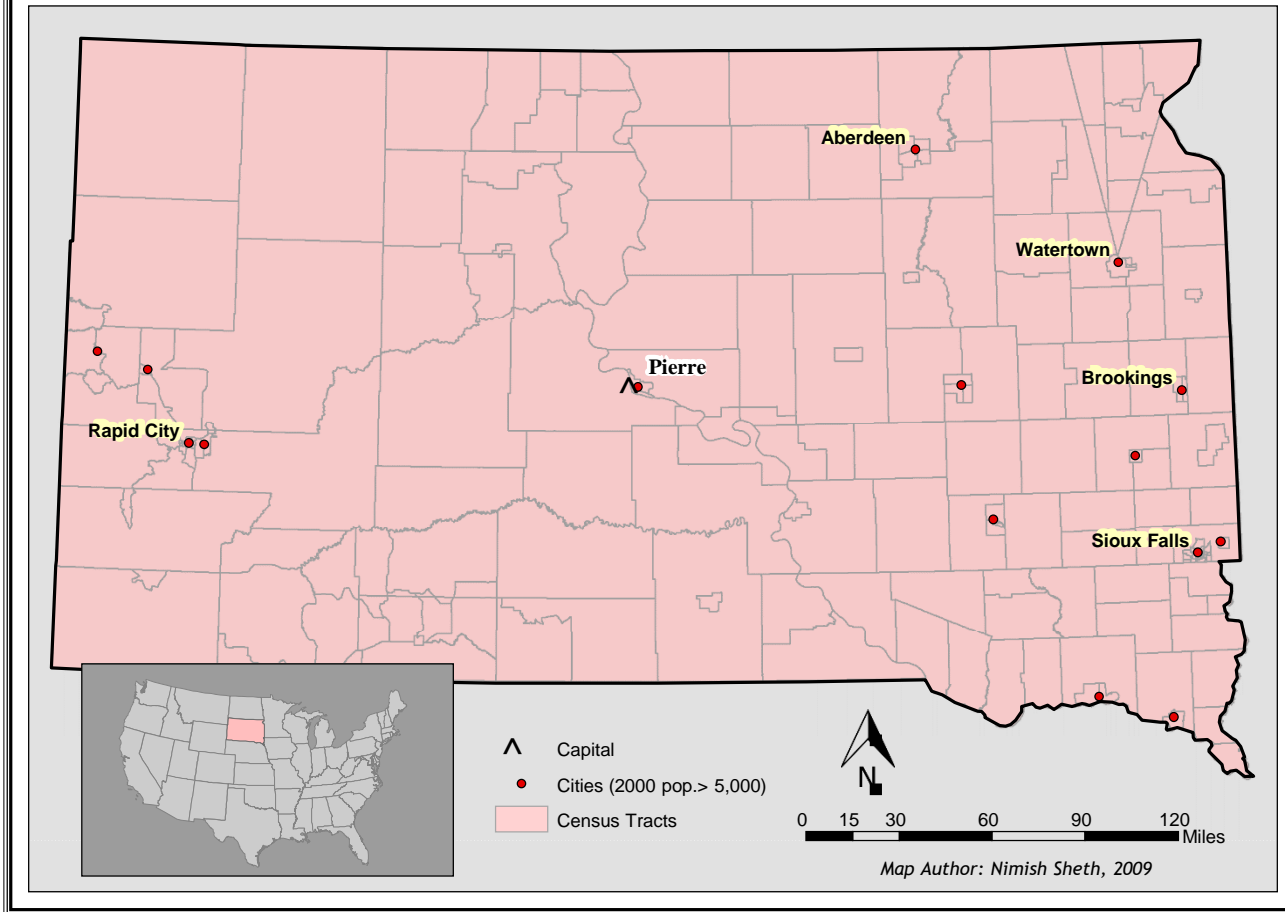
Data for South Dakota

Data	Source
Census Blocks	U.S. Census Bureau
Census Tracts	U.S. Census Bureau
Census Tract Demographics	U.S. Census Bureau
Supermarkets (except convenience stores)	ReferenceUSA
Roads	South Dakota Dept. of Transportation
Cities	MGIS (Price), U.S. Census Bureau
State, Counties	MGIS (Price)

Data Processing



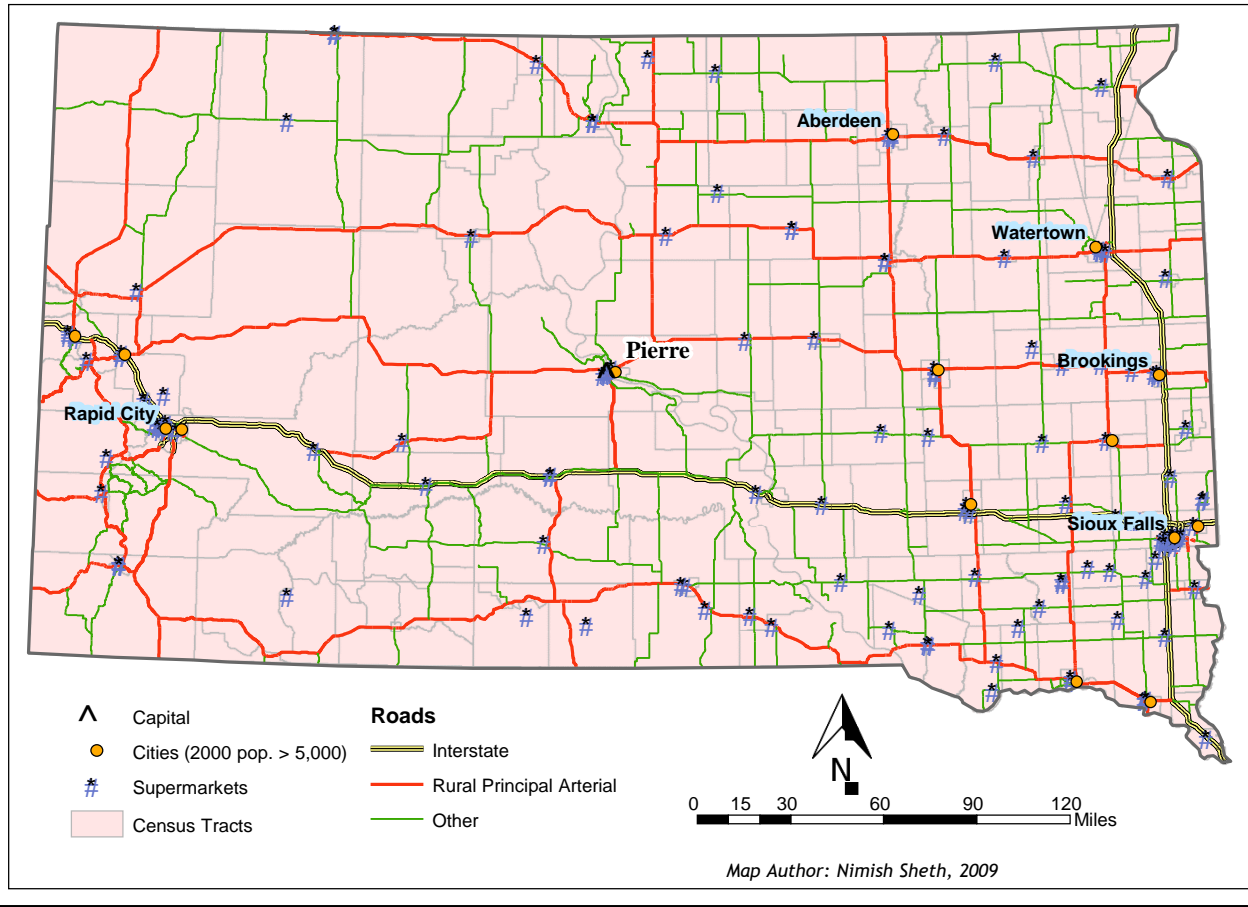
South Dakota, U.S.



- Large, rural Midwestern state - 75,885 sq. miles
- 2000 population - 754,844; Pop. density – 9.9/sq. mile
- 2000 per capita money income - \$17,562
- 13.2% of the population below the poverty line (poverty threshold:
1 person - \$8,794; Family (3) - \$13,861)

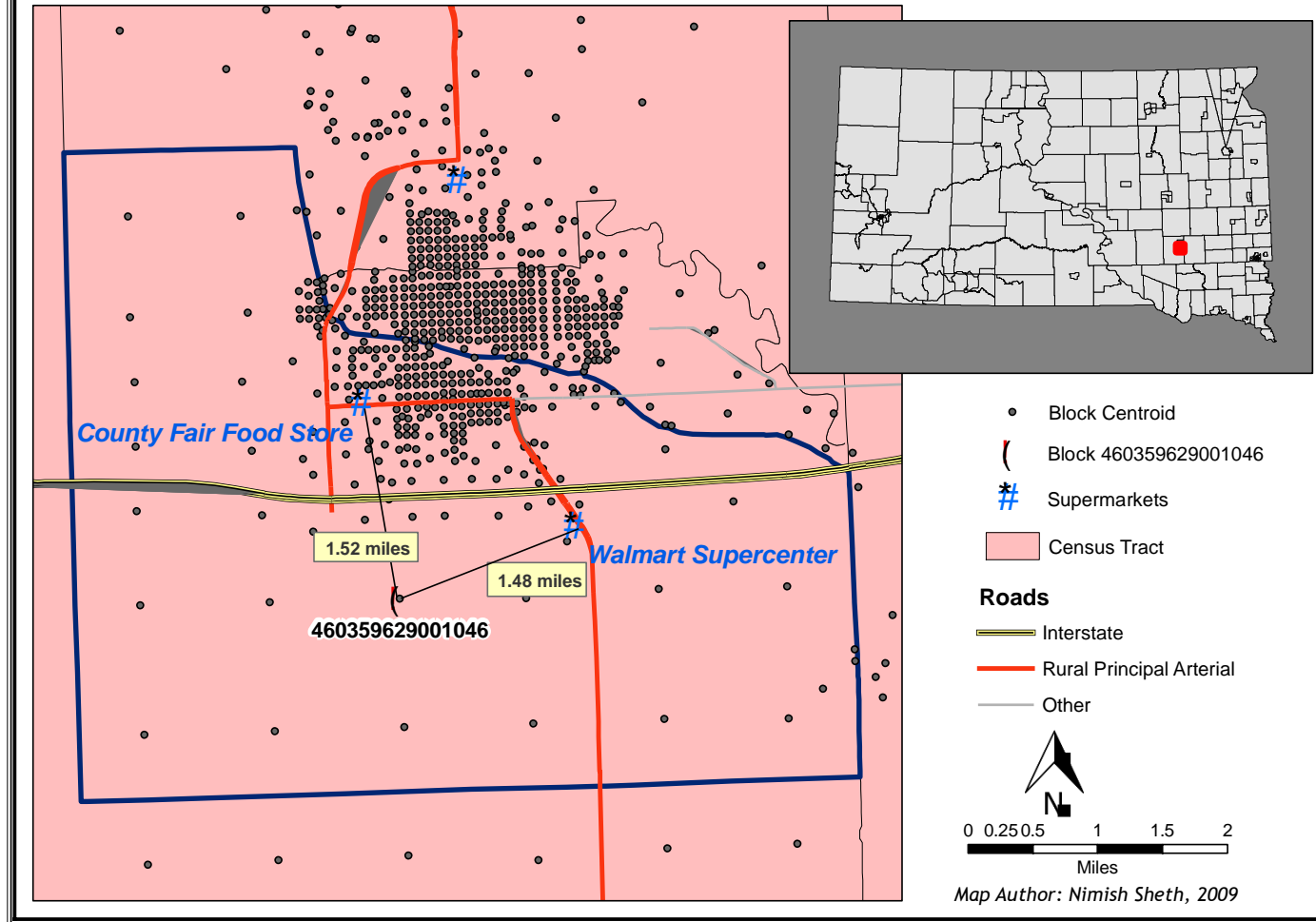
From US Census Bureau

Census Tracts and Supermarkets in South Dakota



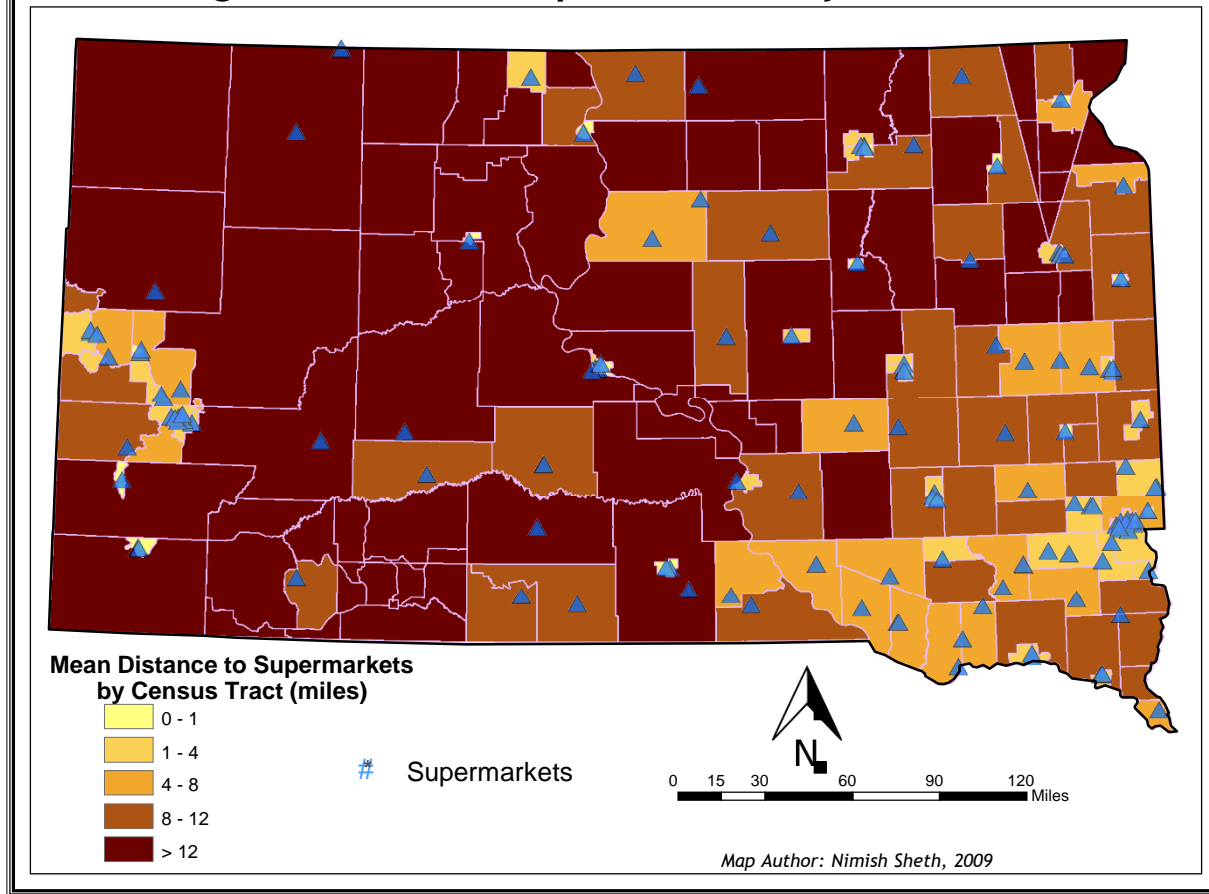
- 66 counties
- 235 census tracts
- 77,951 census blocks
- 144 supermarkets (NAICS code 445110 & 2,500+ sq. ft.)

Closest supermarket to block centroid



- Closest supermarket to block centroid
- Mean distance by census tract

Average Distance to Supermarkets by Census Tract

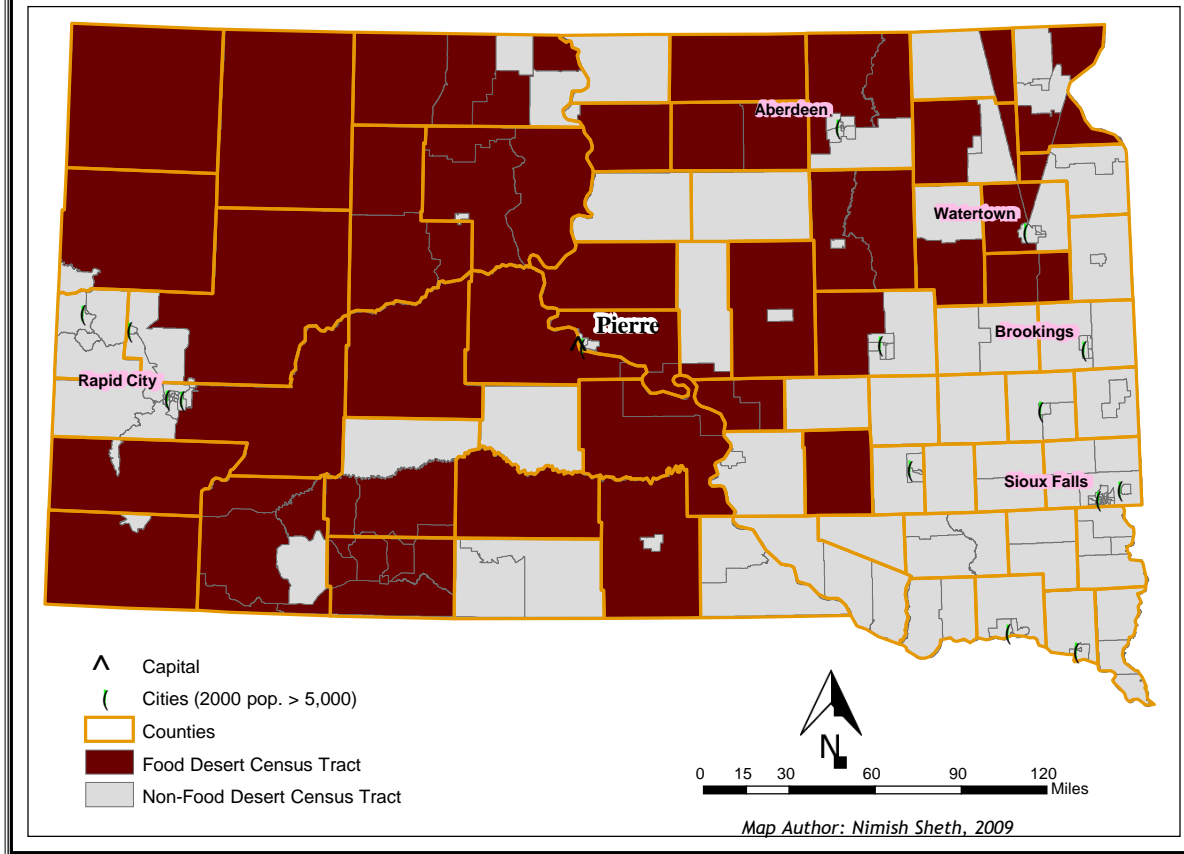


- Avg. U.S. grocery trip: 8 miles – 1995 Natl. Transportation Survey (*Morton & Blanchard, 2007*)
- Tracts with a mean distance > 12 miles deemed food desert
- 75 of 235 tracts identified as food deserts (31.9%)
 - account for 16.9% of state population
 - mean distance to supermarket is 17.5 miles vs. 6.3 miles for non-food deserts

Characteristics of Food Deserts

Characteristic	Food Desert Tracts	Non-Food Desert Tracts
Median Household Income	26,156	34,600
Population 18 and over	75,321	473,450
Percent population 20 to 34	14.4	19.8
Percent population 65 and up	15.1	14.2
Percent rural population	93.7	40.4
Total Housing Units	49,109	274,099
Percentage of people with High School diploma or more, age 25 and more	78.3	84.0
Percent disabled, 21-64 years	18.6	15.1
Percent disabled, 65 and over	39.4	39.6
Percent families in poverty	16.4	8.1
Percent individuals in poverty	22.1	11.6
Percent 65 and over in poverty	22.0	11.0

Food Desert Categorization of Census Tracts



- Of the 20 poorest tracts (based on individual poverty rate), 15 identified as food deserts
 - 5 of these 15 tracts are among the 20 tracts with the lowest educational attainment (based on percentage of people with High School diploma or more)
- Of the 20 tracts with the lowest educational attainment, 14 identified as food deserts
- Of the 20 food deserts with the greatest distance from supermarkets:
 - 4 are among the top 20 tracts with greatest rate of individual poverty
 - 3 are among the top 20 tracts with the least educational attainment
 - 2 are among the top 20 tracts with the least median household Income

Limitations and Future Research

- Block centroids are a gross approximation of residential locations
- Euclidean distance not reflective of true travel distance
- Residents not constrained by state boundaries
- Home/community gardens, farmers' markets, etc. not considered
- Economic and Informational food access

References

- U.S. Census Bureau
- ReferenceUSA
- South Dakota Dept. of Transportation
- Price, M. Mastering ArcGIS, 4th Edition (Exercise Data)
- Morton, L.W. and Blanchard, T.C. (2007). “Starved for Access: Life in Rural America’s Food Deserts.” *Rural Realities* 1 (4): 1-10.
- Morton, L.W. et al., (2005). “Solving the Problems of Iowa Food Deserts: Food Insecurity and Perceptions of Civic Structure.” *Rural Sociology* 70 (1): 94-112.